

What is claimed is:

- 1 1. A mesoporous silica/fluorinated polymer composite
2 material, comprising:
3 10 to 70 parts by weight of hydrophobic modified
4 mesoporous silica having a pore size of 0.1 to
5 50nm, and
6 30 to 90 parts by weight of fluorinated polymer.
- 1 2. The composite material as claimed in claim 1, wherein
2 the surface of the hydrophobic modified mesoporous silica is
3 chemically hydrophobically modified.
- 1 3. The composite material as claimed in claim 2, wherein
2 the surface of the hydrophobic modified mesoporous silica is
3 chemically bonded to a hydrophobic modifier.
- 1 4. The composite material as claimed in claim 3, wherein
2 the hydrophobic modifier is hydrophobic silane, halosilane,
3 haloalkane, or a combination thereof.
- 1 5. The composite material as claimed in claim 1, wherein
2 the surface of the hydrophobic modified mesoporous silica is
3 physically hydrophobically modified.
- 1 6. The composite material as claimed in claim 5, wherein
2 the hydrophobic modified mesoporous silica is coated with a
3 hydrophobic modifier.
- 1 7. The composite material as claimed in claim 6, wherein
2 the hydrophobic modifier is silane, halosilane, haloalkane,
3 or a combination thereof.
- 1 8. The composite material as claimed in claim 7, wherein
2 the silane is p-chlorotolyl trimethoxy silane, amino ethyl
3 amino trimethoxy silane, phenyl trimethoxy silane, amino

4 ethyl amino propyl trimethoxy silane, 3,3,3-
5 trifluoropropyltrimethoxysilane), or a combination thereof.

1 9. The composite material as claimed in claim 1, wherein
2 the fluorinated polymer is polytetrafluoroethylene,
3 polyhexafluoropropene, tetrafluoroethylene-hexafluoropropene
4 copolymer, alkoxy fluoroethylene copolymer, ethylene-
5 tetrafluoroethylene copolymer, or a combination thereof.

1 10. The composite material as claimed in claim 1,
2 wherein the pore of the hydrophobic modified mesoporous
3 silica is square or hexagonal.

1 11. The composite material as claimed in claim 10,
2 wherein the pore of the hydrophobic modified mesoporous
3 silica is regularly arranged.

1 12. The composite material as claimed in claim 10,
2 wherein the pore of the hydrophobic modified mesoporous
3 silica is irregularly arranged.

1 13. The composite material as claimed in claim 1,
2 wherein the hydrophobic modified mesoporous silica is
3 granular.

1 14. The composite material as claimed in claim 1,
2 wherein the hydrophobic modified mesoporous silica is
3 fibrous.

1 15. A mesoporous silica/fluorinated polymer composite
2 material, comprising hydrophobic modified mesoporous silica
3 having a pore size of 0.1 to 50nm and fluorinated polymer in
4 proportion such that the mesoporous silica/fluorinated
5 polymer composite material has dielectric constant,
6 dissipation factor, and coefficient of thermal expansion less
7 than 4, 0.04, and 60ppm/°C, respectively.

1 16. The composite material as claimed in claim 15,
2 wherein the surface of the hydrophobic modified mesoporous
3 silica is chemically hydrophobically modified.

1 17. The composite material as claimed in claim 16,
2 wherein the surface of the hydrophobic modified mesoporous
3 silica is chemically bonded to a hydrophobic modifier.

1 18. The composite material as claimed in claim 17,
2 wherein the hydrophobic modifier is hydrophobic silane,
3 halosilane, haloalkane, or a combination thereof.

1 19. The composite material as claimed in claim 15,
2 wherein the surface of the hydrophobic modified mesoporous
3 silica is physically hydrophobically modified.

1 20. The composite material as claimed in claim 19,
2 wherein the hydrophobic modified mesoporous silica is coated
3 with a hydrophobic modifier.

1 21. The composite material as claimed in claim 20,
2 wherein the hydrophobic modifier is silane, halosilane,
3 haloalkane, or a combination thereof.

1 22. The composite material as claimed in claim 21,
2 wherein the silane is p-chlorotolyl trimethoxy silane, amino
3 ethyl amino trimethoxy silane, phenyl trimethoxy silane,
4 amino ethyl amino propyl trimethoxy silane, 3,3,3-
5 trifluoropropyltrimethoxysilane, or a combination thereof.

1 23. The composite material as claimed in claim 15,
2 wherein the fluorinated polymer is polytetrafluoroethylene,
3 polyhexafluoropropene, tetrafluoroethylene-hexafluoropropene
4 copolymer, alkoxy fluoroethylene copolymer, ethylene-
5 tetrafluoroethylene copolymer, or a combination thereof.

1 24. The composite material as claimed in claim 15,
2 wherein the pore of the hydrophobic modified mesoporous
3 silica is square or hexagonal.

1 25. The composite material as claimed in claim 24,
2 wherein the pore of the hydrophobic modified mesoporous
3 silica is regularly arranged.

1 26. The composite material as claimed in claim 24,
2 wherein the pore of the hydrophobic modified mesoporous
3 silica is irregularly arranged.

1 27. The composite material as claimed in claim 15,
2 wherein the hydrophobic modified mesoporous silica is
3 granular.

1 28. The composite material as claimed in claim 15,
2 wherein the hydrophobic modified mesoporous silica is
3 fibrous.